NMCP COVID-19 Literature Report #59: Friday, 12 February 2021

Prepared By: Tracy C. Shields, MSIS, AHIP <tracy.c.shields2.civ@mail.mil>
Reference Medical Librarian; Naval Medical Center Portsmouth, Library Services

Purpose: These weekly reports, published on Fridays, are curated collections of current research, evidence reviews, special reports, grey literature, and news regarding the COVID-19 pandemic that may be of interest to medical providers, leadership, and decision makers.

All reports are available online at https://nmcp.libguides.com/covidreport. Access is private; you will need to use the direct link or bookmark the URL, along with the case-sensitive password "NMCPfinest".

Disclaimer: I am not a medical professional. This document is current as of the date noted above. While I make every effort to find and summarize available data, I cannot cover everything in the literature on COVID-19. Please feel free to reach out with questions, suggestions for future topics, or any other feedback.

Statistics

Global today: 107,897,155 confirmed cases and 2,370,870 deaths in 192 countries/regions

05 FEB 2021: 105,006,686 confirmed cases and 2,287,129 deaths in 192 countries/regions

29 JAN 2021: 101,605,084 confirmed cases and 2,194,204 deaths in 192 countries/regions

*United States** top 5 states by cases

	TOTAL US	CA	TX	FL	NY	IL
Cases	27,384,595	3,461,753	2,543,687	1,806,605	1,514,070	1,155,833
Deaths	475,471	46,022	40,535	28,382	45,453	21,985

*see census.gov for current US Population data; NA: not all data available JHU CSSE as of 1000 EDT 12 February 2021

Virginia is ranked 17th in cases and 21st in deaths.

Virginia	Total (state)	Chesapeake	Hampton	Newport News	Norfolk	Portsmouth	Suffolk	Virginia Beach
Cases	544,209	16,985	7,986	10,594	13,878	7,145	6,443	28,608
Hospitalizations	22,718	794	262	282	745	511	343	1,186
Deaths	6,966	146	84	113	149	107	119	239

VA DOH as of 1000 EDT 12 February 2021

Special Reports

JHCHS: Equity in Vaccination: A Plan to Work with Communities of Color Toward COVID-19 Recovery and Beyond (posted 09 February 2021)

> "The coronavirus disease 2019 (COVID-19) pandemic has had tragic and disproportionate adverse effects on Black, Indigenous, and People of Color (BIPOC) communities across the United States. The number of cases, hospitalizations, and deaths related to this disease is significantly higher in these groups. Additionally, members of BIPOC communities are among those hit the hardest by the economic and social upheavals caused by the pandemic.
>
> As the COVID-19 vaccination campaign begins, it is critical that vaccines be delivered fairly and equitably—so that everyone has the same level of access to this lifesaving technology. Just as pressing is the need to address longstanding disparities that have created the unequal situation that BIPOC communities are now in.
>
> This plan provides elected and appointed officials with the tools to create, implement, and support a vaccination campaign that works with BIPOC communities to remedy COVID-19 impacts, prevent even more health burdens, lay the foundation for unbiased healthcare delivery, and enable broader social change and durable community-level opportunities.
>
> The 5 key principles and their associated action items in the plan are:
>
> - Iteration…
> - Involvement…
> - Information…
> - Investment…
> - Integration…
>
> This approach will be challenging. Some may argue that a lack of time or funding or interest are barriers that make such an approach unrealistic, especially in the middle of a pandemic that is challenging on every front. However, it is important to keep in mind that challenges like the one we are currently facing often stem from social inequity and provide opportunities to change and improve. Some actions may be more appropriate to prioritize in the near term, but many actions that are crucial for the long term will have more of an overall impact if those efforts are initiated now.
>
> COVID-19 vaccination is the most likely way out of the current pandemic. It is also an opening to create equity and durable benefits for BIPOC communities, who have been devalued and too often cut out of opportunities in the United States. We hope that you consider this and the specific recommendations made in this report as you begin to implement COVID-19 vaccination campaigns in your own towns, cities, and states."

Selected Literature: Peer-Reviewed Journals

Date given is the date published or posted online; often these papers are ahead of print.

11 February 2021

JAMA Netw Open: Comparison of Severe Acute Respiratory Syndrome Coronavirus 2 Screening Using Reverse Transcriptase–Quantitative Polymerase Chain Reaction or CRISPR-Based Assays in Asymptomatic College Students

> "Question: Are CRISPR-based methods a reliable and accessible option to capture severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) outbreaks in a college population?
>
> Findings: In this cohort study, 1808 asymptomatic college students were screened for SARS-CoV-2 status using reverse transcriptase–quantitative polymerase chain reaction (RT-qPCR) and CRISPR-based assays. Nine samples positive for SARS-CoV-2 were detected by RT-qPCR, and 8 were confirmed by CRISPR-based assay and clinical laboratory diagnostic testing, uncovering a change in viral prevalence that coincided with the relaxation of lockdown measures and the rise of coronavirus disease 2019 cases in the community.
>
> Meaning: CRISPR-based methods appear to offer reliable SARS-CoV-2 testing for virus screening and allow capture of the leading edge of an outbreak."

10 February 2021

Clin Infect Dis: COVID-19 Diagnostic Clinical Decision Support: a Pre-Post Implementation Study of CORAL (COvid Risk cALculator)

> "Isolation of hospitalized persons under investigation (PUIs) for COVID-19 reduces nosocomial transmission risk. Efficient PUI evaluation is needed to preserve scarce healthcare resources. We describe the development, implementation, and outcomes of an inpatient diagnostic algorithm and clinical decision support system (CDSS) to evaluate PUIs.
>
> We conducted a pre-post study of CORAL (COvid Risk cALculator), a CDSS that guides frontline clinicians through a risk-stratified COVID-19 diagnostic workup, removes transmission-based precautions when workup is complete and negative, and triages complex cases to Infectious Diseases (ID) physician review. Pre-CORAL, ID physicians reviewed all PUI records to guide workup and precautions. Post-CORAL, frontline clinicians evaluated PUIs directly using CORAL. We compared pre- and post-CORAL frequency of repeat SARS-CoV-2 nucleic acid amplification tests (NAATs), time from NAAT result to PUI status discontinuation, total duration of PUI status, and ID physician work-hours, using linear and logistic regression, adjusted for COVID-19 incidence.

Fewer PUIs underwent repeat testing after an initial negative NAAT post-CORAL than pre-CORAL (54% vs. 67%; aOR 0.53, 95% CI: 0.44-0.63, p<0.01). CORAL significantly reduced average time to PUI status discontinuation (adjusted difference: -7.4 [SE 0.8] hours/patient; p<0.01), total duration of PUI status (adjusted difference: -19.5 [SE 1.9] hours/patient; p<0.01), and average ID physician work-hours (adjusted difference: -57.4 [SE 2.0] hours/day; p<0.01). No patients had a positive NAAT within 7 days after discontinuation of precautions via CORAL.

CORAL is an efficient and effective CDSS to guide frontline clinicians through the diagnostic evaluation of PUIs and safe discontinuation of precautions."

Clin Infect Dis: Severe reinfection with South African SARS-CoV-2 variant 501Y.V2: A case report

"We here report a case of severe SARS-CoV-2 reinfection with South African variant 501Y.V2, four months after recovering from a first episode of COVID-19."

CMAJ: Characteristics and outcomes of hospital admissions for COVID-19 and influenza in the Toronto area

"We described all adults with COVID-19 or influenza discharged from inpatient medical services and medical–surgical intensive care units (ICUs) between Nov. 1, 2019, and June 30, 2020, at 7 hospitals in Toronto and Mississauga, Ontario. We compared patient outcomes using multivariable regression models, controlling for patient sociodemographic factors and comorbidity level. We validated the accuracy of 7 externally developed risk scores to predict mortality among patients with COVID-19.

There were 1027 hospital admissions with COVID-19 (median age 65 yr, 59.1% male) and 783 with influenza (median age 68 yr, 50.8% male). Patients younger than 50 years accounted for 21.2% of all admissions for COVID-19 and 24.0% of ICU admissions. Compared with influenza, patients with COVID-19 had significantly greater in-hospital mortality (unadjusted 19.9% v. 6.1%, adjusted relative risk [RR] 3.46, 95% confidence interval [CI] 2.56–4.68), ICU use (unadjusted 26.4% v. 18.0%, adjusted RR 1.50, 95% CI 1.25–1.80) and hospital length of stay (unadjusted median 8.7 d v. 4.8 d, adjusted rate ratio 1.45, 95% CI 1.25–1.69). Thirty-day readmission was not significantly different (unadjusted 9.3% v. 9.6%, adjusted RR 0.98, 95% CI 0.70–1.39). Three points-based risk scores for predicting in-hospital mortality showed good discrimination (area under the receiver operating characteristic curve [AUC] ranging from 0.72 to 0.81) and calibration.

During the first wave of the pandemic, admission to hospital for COVID-19 was associated with significantly greater mortality, ICU use and hospital length of stay than influenza. Simple risk scores can predict in-hospital mortality in patients with COVID-19 with good accuracy."

MMWR: [Maximizing Fit for Cloth and Medical Procedure Masks to Improve Performance and Reduce SARS-CoV-2 Transmission and Exposure, 2021]

"What is already known about this topic? Universal masking is recommended to slow the spread of COVID-19. Cloth masks and medical procedure masks substantially reduce exposure from infected wearers (source control) and reduce exposure of uninfected wearers (wearer exposure).

What is added by this report? CDC conducted experiments to assess two ways of improving the fit of medical procedure masks: fitting a cloth mask over a medical procedure mask, and knotting the ear loops of a medical procedure mask and then tucking in and flattening the extra material close to the face. Each modification substantially improved source control and reduced wearer exposure.

What are the implications for public health? These experiments highlight the importance of good fit to maximize mask performance. There are multiple simple ways to achieve better fit of masks to more effectively slow the spread of COVID-19."

PNAS: [Quantifying asymptomatic infection and transmission of COVID-19 in New York City using observed cases, serology, and testing capacity]

"The contributions of asymptomatic infections to herd immunity and community transmission are key to the resurgence and control of COVID-19, but are difficult to estimate using current models that ignore changes in testing capacity. Using a model that incorporates daily testing information fit to the case and serology data from New York City,

we show that the proportion of symptomatic cases is low, ranging from 13 to 18%, and that the reproductive number may be larger than often assumed. Asymptomatic infections contribute substantially to herd immunity, and to community transmission together with presymptomatic ones. If asymptomatic infections transmit at similar rates as symptomatic ones, the overall reproductive number across all classes is larger than often assumed, with estimates ranging from 3.2 to 4.4. If they transmit poorly, then symptomatic cases have a larger reproductive number ranging from 3.9 to 8.1. Even in this regime, presymptomatic and asymptomatic cases together comprise at least 50% of the force of infection at the outbreak peak. We find no regimes in which all infection subpopulations have reproductive numbers lower than three. These findings elucidate the uncertainty that current case and serology data cannot resolve, despite consideration of different model structures. They also emphasize how temporal data on testing can reduce and better define this uncertainty, as we move forward through longer surveillance and second epidemic waves. Complementary information is required to determine the transmissibility of asymptomatic cases, which we discuss. Regardless, current assumptions about the basic reproductive number of severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) should be reconsidered."

09 February 2021

Alzheimers Dementia: COVID-19 and dementia: Analyses of risk, disparity, and outcomes from electronic health records in the US

"At present, there is limited data on the risks, disparity, and outcomes for COVID-19 in patients with dementia in the United States.

This is a retrospective case-control analysis of patient electronic health records (EHRs) of 61.9 million adult and senior patients (age ≥ 18 years) in the United States up to August 21, 2020.

Patients with dementia were at increased risk for COVID-19 compared to patients without dementia (adjusted odds ratio [AOR]: 2.00 [95% confidence interval (CI), 1.94–2.06], P < .001), with the strongest effect for vascular dementia (AOR: 3.17 [95% CI, 2.97–3.37], P < .001), followed by presenile dementia (AOR: 2.62 [95% CI, 2.28–3.00], P < .001), Alzheimer's disease (AOR: 1.86 [95% CI, 1.77–1.96], P < .001), senile dementia (AOR: 1.99 [95% CI, 1.86–2.13], P < .001) and post-traumatic dementia (AOR: 1.67 [95% CI, 1.51–1.86] P < .001). Blacks with dementia had higher risk of COVID-19 than Whites (AOR: 2.86 [95% CI, 2.67–3.06], P < .001). The 6-month mortality and hospitalization risks in patients with dementia and COVID-19 were 20.99% and 59.26%, respectively.

These findings highlight the need to protect patients with dementia as part of the strategy to control the COVID-19 pandemic."

Immunity: COVID-19 immune signatures reveal stable antiviral T cell function despite declining humoral responses

> "Cellular and humoral immunity to SARS-CoV-2 is critical to control primary infection and correlates with severity of disease. The role of SARS-CoV-2-specific T cell immunity, its relationship to antibodies, and pre-existing immunity against endemic coronaviruses (huCoV), which has been hypothesized to be protective, were investigated in 82 healthy donors (HDs), 204 recovered (RCs), and 92 active COVID-19 patients (ACs). ACs had high amounts of anti-SARS-CoV-2 nucleocapsid and spike IgG but lymphopenia and overall reduced antiviral T cell responses due to the inflammatory milieu, expression of inhibitory molecules (PD-1, Tim-3) as well as effector caspase-3, -7, and -8 activity in T cells. SARS-CoV-2-specific T cell immunity conferred by polyfunctional, mainly interferon-γ-secreting CD4+ T cells remained stable throughout convalescence, whereas humoral responses declined. Immune responses toward huCoV in RCs with mild disease and strong cellular SARS-CoV-2 T cell reactivity imply a protective role of pre-existing immunity against huCoV."

mBio: Characterization of SARS-CoV-2 RNA, Antibodies, and Neutralizing Capacity in Milk Produced by Women with COVID-19

> "Whether mother-to-infant SARS-CoV-2 transmission can occur during breastfeeding and, if so, whether the benefits of breastfeeding outweigh this risk during maternal COVID-19 illness remain important questions. Using RT-qPCR, we did not detect SARS-CoV-2 RNA in any milk sample (n = 37) collected from 18 women following COVID-19 diagnosis. Although we detected evidence of viral RNA on 8 out of 70 breast skin swabs, only one was considered a conclusive positive result. In contrast, 76% of the milk samples collected from women with COVID-19 contained SARS-CoV-2-specific IgA, and 80% had SARS-CoV-2-specific IgG. In addition, 62% of the milk samples were able to neutralize SARS-CoV-2 infectivity in vitro, whereas milk samples collected prior to the COVID-19 pandemic were unable to do so. Taken together, our data do not support mother-to-infant transmission of SARS-CoV-2 via milk. Importantly, milk produced by infected mothers is a beneficial source of anti-SARS-CoV-2 IgA and IgG and neutralizes SARS-CoV-2 activity. These results support recommendations to continue breastfeeding during mild-to-moderate maternal COVID-19 illness."

MMWR: COVID-19 Vaccination Intent, Perceptions, and Reasons for Not Vaccinating Among Groups Prioritized for Early Vaccination — United States, September and December 2020

> "What is already known about this topic? National polls conducted before vaccine distribution began suggested that many persons were hesitant to receive COVID-19 vaccination.
>
> What is added by this report? From September to December 2020, intent to receive COVID-19 vaccination increased from 39.4% to 49.1% among adults and across all priority groups,

and nonintent decreased from 38.1% to 32.1%. Despite decreases in nonintent from September to December, younger adults, women, non-Hispanic Black adults, adults living in nonmetropolitan areas, and adults with less education and income, and without health insurance continue to have the highest estimates of nonintent to receive COVID-19 vaccination.

What are the implications for public health practice? Ensuring high and equitable vaccination coverage among all populations, including by addressing reasons for not intending to receive vaccination, is critical to prevent the spread of COVID-19 and bring an end to the pandemic."

Phys Fluids: Simulation-based study of COVID-19 outbreak associated with air-conditioning in a restaurant

"COVID-19 has shown a high potential of transmission via virus-carrying aerosols as supported by growing evidence. However, detailed investigations that draw direct links between aerosol transport and virus infection are still lacking. To fill in the gap, we conducted a systematic computational fluid dynamics (CFD)-based investigation of indoor airflow and the associated aerosol transport in a restaurant setting, where likely cases of airflow-induced infection of COVID-19 caused by asymptomatic individuals were widely reported by the media. We employed an advanced in-house large eddy simulation solver and other cutting-edge numerical methods to resolve complex indoor processes simultaneously, including turbulence, flow–aerosol interplay, thermal effect, and the filtration effect by air conditioners. Using the aerosol exposure index derived from the simulation, we are able to provide a spatial map of the airborne infection risk under different settings. Our results have shown a remarkable direct linkage between regions of high aerosol exposure index and the reported infection patterns in the restaurant, providing strong support to the airborne transmission occurring in this widely reported incident. Using flow structure analysis and reverse-time tracing of aerosol trajectories, we are able to further pinpoint the influence of environmental parameters on the infection risks and highlight the need for more effective preventive measures, e.g., placement of shielding according to the local flow patterns. Our research, thus, has demonstrated the capability and value of high-fidelity CFD tools for airborne infection risk assessment and the development of effective preventive measures."

Phys Fluids: Why coronavirus survives longer on impermeable than porous surfaces

"Previous studies reported that the drying time of a respiratory droplet on an impermeable surface along with a residual film left on it is correlated with the coronavirus survival time. Notably, earlier virus titer measurements revealed that the survival time is surprisingly less on porous surfaces such as paper and cloth than that on impermeable surfaces. Previous studies could not capture this distinct aspect of the porous media. We demonstrate how

the mass loss of a respiratory droplet and the evaporation mechanism of a thin liquid film are modified for the porous media, which leads to a faster decay of the coronavirus on such media. While diffusion-limited evaporation governs the mass loss from the bulk droplet for the impermeable surface, a much faster capillary imbibition process dominates the mass loss for the porous material. After the bulk droplet vanishes, a thin liquid film remaining on the exposed solid area serves as a medium for the virus survival. However, the thin film evaporates much faster on porous surfaces than on impermeable surfaces. The aforesaid faster film evaporation is attributed to droplet spreading due to the capillary action between the contact line and fibers present on the porous surface and the modified effective wetted area due to the voids of porous materials, which leads to an enhanced disjoining pressure within the film, thereby accelerating the film evaporation. Therefore, the porous materials are less susceptible to virus survival. The findings have been compared with the previous virus titer measurements."

PNAS: Exhaled aerosol increases with COVID-19 infection, age, and obesity

"COVID-19 transmits by droplets generated from surfaces of airway mucus during processes of respiration within hosts infected by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus. We studied respiratory droplet generation and exhalation in human and nonhuman primate subjects with and without COVID-19 infection to explore whether SARS-CoV-2 infection, and other changes in physiological state, translate into observable evolution of numbers and sizes of exhaled respiratory droplets in healthy and diseased subjects. In our observational cohort study of the exhaled breath particles of 194 healthy human subjects, and in our experimental infection study of eight nonhuman primates infected, by aerosol, with SARS-CoV-2, we found that exhaled aerosol particles vary between subjects by three orders of magnitude, with exhaled respiratory droplet number increasing with degree of COVID-19 infection and elevated BMI-years. We observed that 18% of human subjects (35) accounted for 80% of the exhaled bioaerosol of the group (194), reflecting a superspreader distribution of bioaerosol analogous to a classical 20:80 superspreader of infection distribution. These findings suggest that quantitative assessment and control of exhaled aerosol may be critical to slowing the airborne spread of COVID-19 in the absence of an effective and widely disseminated vaccine."

08 February 2021

AIDS Rev: The Importance of Understanding the Stages of COVID-19 in Treatment and Trials

"COVID-19, caused by SARS-CoV-2, continues to be a major health problem since its first description in Wuhan, China, in December 2019. Multiple drugs have been tried to date in the treatment of COVID-19. Critical to treatment of COVID-19 and advancing therapeutics is an appreciation of the multiple stages of this disease and the importance of timing for

investigation and use of various agents. We considered articles related to COVID-19 indexed on PubMed published January 1, 2020-November 15, 2020, and considered papers on the medRxiv preprint server. We identified relevant stages of COVID-19 including three periods: pre-exposure; incubation, and detectable viral replication, and five phases: the viral symptom phase, the early inflammatory phase, the secondary infection phase, the multisystem inflammatory phase, and the tail phase. This common terminology should serve as a framework to guide when COVID-19 therapeutics being studied or currently in use is likely to provide benefit rather than harm."

Clin Exp Med: Clinical presentation, therapeutic approach, and outcome of young patients admitted for COVID-19, with respect to the elderly counterpart

"There is limited information on the presenting characteristics, prognosis, and therapeutic approaches of young patients hospitalized for coronavirus disease 2019 (COVID-19). We sought to investigate the baseline characteristics, in-hospital treatment, and outcomes of a wide cohort < 65 years admitted for COVID-19. Using the international multicenter HOPE-COVID-19 registry, we evaluated the baseline characteristics, clinical presentation, therapeutic approach, and prognosis of patients < 65 years discharged (deceased or alive) after hospital admission for COVID-19, also compared with the elderly counterpart. Of the included 5746 patients, 2676 were < 65 and 3070 ≥ 65 years. All risk factors and several parameters suggestive of worse clinical presentation augmented through increasing age classes. In-hospital mortality rates were 6.8% and 32.1% in the younger and older cohort, respectively ($p < 0.001$). Among young patients, mortality, access to ICU and treatment with IMVwere positively correlated with age. Contrariwise, over 65 years of age this trend was broken so that only the association between age and mortality was persistent, while the rates of access to ICU and IMV started to decline. Younger patients also recognized specific predictors of case fatality, such as obesity and gender. Age negatively impacts on mortality, access to ICU and treatment with IMV in patients < 65 years. In elderly patients only case fatality rate keeps augmenting in a stepwise manner through increasing age categories, while therapeutic approaches become more conservative. Besides age, obesity, gender, history of cancer, and severe dyspnea, tachypnea, chest X-ray bilateral abnormalities, abnormal level of creatinine and leucocyte among admission parameters seem to play a central role in the outcome of patients younger than 65 years."

JAMA Netw Open: Assessment of Seroprevalence of SARS-CoV-2 and Risk Factors Associated With COVID-19 Infection Among Outpatients in Virginia

"Question: What percentage of the Virginia population had been exposed to severe acute respiratory syndrome coronavirus 2 after the first wave of coronavirus disease 2019 (COVID-19) infections in the US?

Findings: In this cross-sectional study of 4675 adult outpatients presenting for non–COVID-19–associated health care in Virginia, a seroprevalence of approximately 2% was found, with an estimated 66% of seropositive results associated with asymptomatic infections. Hispanic ethnicity, residence in a multifamily unit, and contact with an individual with confirmed COVID-19 infection were risk factors significantly associated with exposure.

Meaning: This study found that, as of August 2020, the population of Virginia remained largely immunologically naive to the virus."

JAMA Netw Open: Comparison of Demand for Drugs Used for COVID-19 Treatment and Other Drugs During the Early Phase of the COVID-19 Pandemic in Italy

"This cross-sectional study compares demand for drugs for treatment of coronavirus disease 2019 (COVID-19) between the period directly before the COVID-19 outbreak in Italy and the early period of the outbreak."

Lancet Child Adolesc Health: SARS-CoV-2 transmission among children and staff in daycare centres during a nationwide lockdown in France: a cross-sectional, multicentre, seroprevalence study

"Our cross-sectional, multicentre, seroprevalence study was done at the end of the first wave of the COVID-19 pandemic in France, in June, 2020, 4–8 weeks after the end of the first lockdown. To the best of our knowledge, this was the first multicentre seroprevalence study to focus on preschool-age children in daycare centres. Estimating seroprevalence in very young children and staff attending daycare centres that remained open during a nationwide lockdown in France might help to understand the extent to which very young children contribute to the spread of SARS-CoV-2. Based on serological results, we found that the proportion of children with SARS-CoV-2 seropositivity was low. In an exploratory analysis, the seroprevalence among daycare centre staff did not differ from that observed in a comparator group of adult hospital workers not exposed to children. The main factor associated with SARS-CoV-2 seropositivity in children was contact with an adult household member with laboratory-confirmed COVID-19.

On the basis of these findings, there is no evidence for daycare centres being major foci of viral contagion. Further sero-epidemiological studies are needed to determine the incidence or prevalence, or both, of SARS-CoV-2 infection among children, and to assess the role that children might have in SARS-CoV-2 transmission."

Nat Med: Neutralization of SARS-CoV-2 spike 69/70 deletion, E484K and N501Y variants by BNT162b2 vaccine-elicited sera

"We engineered three severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) viruses containing key spike mutations from the newly emerged United Kingdom (UK) and South African (SA) variants: N501Y from UK and SA; 69/70-deletion + N501Y + D614G from

UK; and E484K + N501Y + D614G from SA. Neutralization geometric mean titers (GMTs) of 20 BTN162b2 vaccine-elicited human sera against the three mutant viruses were 0.81- to 1.46-fold of the GMTs against parental virus, indicating small effects of these mutations on neutralization by sera elicited by two BNT162b2 doses."

npj Digit Med: Tracking COVID-19 using online search

"Previous research has demonstrated that various properties of infectious diseases can be inferred from online search behaviour. In this work we use time series of online search query frequencies to gain insights about the prevalence of COVID-19 in multiple countries. We first develop unsupervised modelling techniques based on associated symptom categories identified by the United Kingdom's National Health Service and Public Health England. We then attempt to minimise an expected bias in these signals caused by public interest—as opposed to infections—using the proportion of news media coverage devoted to COVID-19 as a proxy indicator. Our analysis indicates that models based on online searches precede the reported confirmed cases and deaths by 16.7 (10.2–23.2) and 22.1 (17.4–26.9) days, respectively. We also investigate transfer learning techniques for mapping supervised models from countries where the spread of the disease has progressed extensively to countries that are in earlier phases of their respective epidemic curves. Furthermore, we compare time series of online search activity against confirmed COVID-19 cases or deaths jointly across multiple countries, uncovering interesting querying patterns, including the finding that rarer symptoms are better predictors than common ones. Finally, we show that web searches improve the short-term forecasting accuracy of autoregressive models for COVID-19 deaths. Our work provides evidence that online search data can be used to develop complementary public health surveillance methods to help inform the COVID-19 response in conjunction with more established approaches."

07 February 2021

Clin Infect Dis: The Impact of State Mask-Wearing Requirements on the Growth of COVID-19 Cases in the United States

"In our ecologic analysis of US states, piecewise multivariable models showed lower post- vs. pre-mask case-rate slopes, with -1.08% per 100,000 per day (95% CI: -1.48%, -0.67%) among early- and -0.37% per 100,000 per day (95% CI: -0.86%, 0.10%) among late- versus never-adopter states. Our findings support statewide mask requirements to mitigate COVID-19 transmission."

05 February 2021

Age Ageing: Age and frailty are independently associated with increased COVID-19 mortality and increased care needs in survivors: results of an international multi-centre study

> "Increased mortality has been demonstrated in older adults with COVID-19, but the effect of frailty has been unclear.
>
> This multi-centre cohort study involved patients aged 18 years and older hospitalised with COVID-19, using routinely collected data. We used Cox regression analysis to assess the impact of age, frailty, and delirium on the risk of inpatient mortality, adjusting for sex, illness severity, inflammation, and co-morbidities. We used ordinal logistic regression analysis to assess the impact of age, Clinical Frailty Scale (CFS), and delirium on risk of increased care requirements on discharge, adjusting for the same variables.
>
> Data from 5,711 patients from 55 hospitals in 12 countries were included (median age 74, IQR 54–83; 55.2% male). The risk of death increased independently with increasing age (>80 vs 18–49: HR 3.57, CI 2.54–5.02), frailty (CFS 8 vs 1–3: HR 3.03, CI 2.29–4.00) inflammation, renal disease, cardiovascular disease, and cancer, but not delirium. Age, frailty (CFS 7 vs 1–3: OR 7.00, CI 5.27–9.32), delirium, dementia, and mental health diagnoses were all associated with increased risk of higher care needs on discharge. The likelihood of adverse outcomes increased across all grades of CFS from 4 to 9.
>
> Age and frailty are independently associated with adverse outcomes in COVID-19. Risk of increased care needs was also increased in survivors of COVID-19 with frailty or older age."

BMC Med: COVID-19 pandemic and violence: rising risks and decreasing urgent care-seeking for sexual assault and domestic violence survivors

> "There is little information on care-seeking patterns for sexual assault and domestic violence during the COVID-19 pandemic. The objective of this study was to examine the changes in emergency department (ED) admissions for sexual assault and domestic violence since the COVID-19 pandemic was declared.
>
> Observational ED admissions data from The Ottawa Hospital were analyzed from March 4 to May 5 (62 days) in 2020 (COVID-19 period) and compared to the same period in 2018 (pre-COVID-19). Total and mean weekly admissions were calculated for all-cause ED admissions and for sexual and domestic violence cases. A Poisson regression (without offset term) was used to calculate the weekly case count ratio and 95% confidence intervals (CI) between the two time periods. Case characteristics were compared using chi-square tests, and percent differences were calculated.
>
> Compared to pre-COVID-19, total ED admissions dropped by 1111.22 cases per week (32.9% reduction), and the Sexual Assault and Domestic Violence Program cases dropped 4.66

cases per week. The weekly case count ratio for sexual assault cases was 0.47 (95% CI 0.79–0.27), equivalent of 53.49% reduction in cases, and 0.52 (95% CI 0.93–0.29), equivalent to a 48.45% reduction in physical assault cases. The characteristics of presenting cases were similar by age (median 25 years), sex (88.57% female), assault type (57.14% sexual assault, 48.57% physical assault), and location (31.43% patient's home, 40.00% assailant's home). There was a significant increase in psychological abuse (11.69% vs 28.57%) and assaults occurring outdoors (5.19% vs 22.86%).

This study found a decrease in ED admissions for sexual assault and domestic violence during COVID-19, despite societal conditions that elevate risk of violence. Trends in care-seeking and assault patterns will require ongoing monitoring to inform the provision of optimal support for individuals experiencing violence, particularly as countries begin to re-open or lock-down again."

Eur Heart J: Cardiac arrest in COVID-19: characteristics and outcomes of in- and out-of-hospital cardiac arrest. A report from the Swedish Registry for Cardiopulmonary Resuscitation

"To study the characteristics and outcome among cardiac arrest cases with COVID-19 and differences between the pre-pandemic and the pandemic period in out-of-hospital cardiac arrest (OHCA) and in-hospital cardiac arrest (IHCA).

We included all patients reported to the Swedish Registry for Cardiopulmonary Resuscitation from 1 January to 20 July 2020. We defined 16 March 2020 as the start of the pandemic. We assessed overall and 30-day mortality using Cox regression and logistic regression, respectively. We studied 1946 cases of OHCA and 1080 cases of IHCA during the entire period. During the pandemic, 88 (10.0%) of OHCAs and 72 (16.1%) of IHCAs had ongoing COVID-19. With regards to OHCA during the pandemic, the odds ratio for 30-day mortality in COVID-19-positive cases, compared with COVID-19-negative cases, was 3.40 [95% confidence interval (CI) 1.31–11.64]; the corresponding hazard ratio was 1.45 (95% CI 1.13–1.85). Adjusted 30-day survival was 4.7% for patients with COVID-19, 9.8% for patients without COVID-19, and 7.6% in the pre-pandemic period. With regards to IHCA during the pandemic, the odds ratio for COVID-19-positive cases, compared with COVID-19-negative cases, was 2.27 (95% CI 1.27–4.24); the corresponding hazard ratio was 1.48 (95% CI 1.09–2.01). Adjusted 30-day survival was 23.1% in COVID-19-positive cases, 39.5% in patients without COVID-19, and 36.4% in the pre-pandemic period.

During the pandemic phase, COVID-19 was involved in at least 10% of all OHCAs and 16% of IHCAs, and, among COVID-19 cases, 30-day mortality was increased 3.4-fold in OHCA and 2.3-fold in IHCA."

Lancet Respir Med: Peginterferon lambda for the treatment of outpatients with COVID-19: a phase 2, placebo-controlled randomised trial

> "This study shows that a single subcutaneous injection of 180 µg peginterferon lambda has an antiviral effect in outpatients with COVID-19. The decline in viral load was greater with peginterferon lambda treatment than with placebo. The more rapid viral load decline and higher clearance rate were most pronounced in those with high viral loads, a finding also reported with monoclonal antibody therapies in patients with COVID-19. However, the magnitude of the viral load decline compared with that of placebo was much greater with peginterferon lambda than has been reported with monoclonal antibody therapies to date. Peginterferon lambda was safe and well tolerated in outpatients with mild-to-moderate COVID-19, with a similar side-effect profile to that of placebo and no concerning laboratory adverse events.
>
> No approved therapy exists for outpatients with COVID-19. This study showed that peginterferon lambda accelerated viral clearance, particularly in those with high baseline viral loads, highlighting the importance of quantitative viral load testing in the assessment of antiviral agents for patients with COVID-19. Treatment early in the course of disease might prevent clinical deterioration and shorten the duration of viral shedding, which might have an important public health effect by reducing transmission and reducing the duration of self-isolation."

MMWR: Decline in COVID-19 Hospitalization Growth Rates Associated with Statewide Mask Mandates — 10 States, March–October 2020

> "What is already known about this topic? Wearing masks is recommended to mitigate the spread of COVID-19.
>
> What is added by this report? During March 22–October 17, 2020, 10 sites participating in the COVID-19–Associated Hospitalization Surveillance Network in states with statewide mask mandates reported a decline in weekly COVID-19–associated hospitalization growth rates by up to 5.5 percentage points for adults aged 18–64 years after mandate implementation, compared with growth rates during the 4 weeks preceding implementation of the mandate.
>
> What are the implications for public health practice? Mask-wearing is a component of a multipronged strategy to decrease exposure to and transmission of SARS-CoV-2 and reduce strain on the health care system, with likely direct effects on COVID-19 morbidity and associated mortality."

Nat Hum Behav: Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA

> "Widespread acceptance of a vaccine for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) will be the next major step in fighting the coronavirus disease 2019 (COVID-19) pandemic, but achieving high uptake will be a challenge and may be impeded by online misinformation. To inform successful vaccination campaigns, we conducted a randomized controlled trial in the UK and the USA to quantify how exposure to online misinformation around COVID-19 vaccines affects intent to vaccinate to protect oneself or others. Here we show that in both countries—as of September 2020—fewer people would 'definitely' take a vaccine than is likely required for herd immunity, and that, relative to factual information, recent misinformation induced a decline in intent of 6.2 percentage points (95th percentile interval 3.9 to 8.5) in the UK and 6.4 percentage points (95th percentile interval 4.0 to 8.8) in the USA among those who stated that they would definitely accept a vaccine. We also find that some sociodemographic groups are differentially impacted by exposure to misinformation. Finally, we show that scientific-sounding misinformation is more strongly associated with declines in vaccination intent."

Science: Immunological memory to SARS-CoV-2 assessed for up to 8 months after infection

> "Immune memory against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) helps to determine protection against reinfection, disease risk, and vaccine efficacy. Using 188 human cases across the range of severity of COVID-19, Dan et al. analyzed cross-sectional data describing the dynamics of SARS-CoV-2 memory B cells, CD8+ T cells, and CD4+ T cells for more than 6 months after infection. The authors found a high degree of heterogeneity in the magnitude of adaptive immune responses that persisted into the immune memory phase to the virus. However, immune memory in three immunological compartments remained measurable in greater than 90% of subjects for more than 5 months after infection. Despite the heterogeneity of immune responses, these results show that durable immunity against secondary COVID-19 disease is a possibility for most individuals."

04 February 2021

Acta Paediatr: The COVID-19 pandemic dramatically reduced admissions of children with and without chronic conditions to general paediatric wards

> "We examined the impact of the COVID-19 pandemic on how many children were admitted to Israel's largest tertiary paediatric hospital and why they were admitted.
>
> Israel declared COVID-19 a national emergency on 19 March 2020. This study examined daily hospital admissions to our three general paediatric wards during the COVID-19

lockdown period from 20 March to 18 April 2020. These 258 admissions were compared with the 4,217 admissions from the period immediately before this, 1 February to 19 March 2020, plus 1 February to 18 April in 2018 and 2019. We also compared why patients were admitted during the study period, and any pre-existing conditions, with 638 children hospitalised during the same period in 2019.

The mean number of daily hospitalisations during the COVID-19 lockdown period was 8.6, which was 59% lower than the 20.9 recorded during the other three periods before COVID-19. There was a significant decrease in the number of patients admitted with infectious (74%) and non-infectious (44%) aetiologies from 2019 to 2020 and these occurred among patients with (58%), and without (55%), pre-existing medical conditions.

The Israeli COVID-19 lockdown had a dramatic effect on admissions to the paediatric wards of a tertiary hospital."

Int Forum Allergy Rhinol: Patient-reported olfactory recovery after SARS-CoV-2 infection: A 6-month follow-up study

Summary from COVID-19 LST: "Otolaryngologists and infectious disease physicians from Italy surveyed a cohort of patients infected with SARS-CoV-2 who reported olfactory dysfunction (n=126) between February and September 2020 (Table 1). Of 110 respondents, 63% (n=70) reported complete recovery of olfactory function and 22% (n=24) partial recovery, with multivariable analysis showing cigarette smoking as the only factor significantly associated with recovery (Table 2). Authors suggest many, but not all, patients with olfactory dysfunction associated with SARS-CoV-2 infection recover their ability to smell, but that their results are limited by lack of an objective olfactory assessment."

J Diabetes Investig: Glycemic control in type 1 diabetes children and teenagers around lockdown for COVID-19: a continuous glucose monitoring based observational study

"COVID-19 pandemic has urged the authorities to impose rigorous quarantines and brought considerable changes to lifestyles. The impact of these changes on glycemic control has remained unclear, especially the long-term effect. We aimed to investigate the impact of lockdown on glycemic control in type 1 diabetes (T1D) children and adolescents.

This observational study enrolled T1D children using continuous glucose monitoring (CGM). CGM data were extracted from the cloud-based platform before, during, and after lockdown. Demographics and lifestyle change-related information were collected from database or questionnaires. We compared these data before, during, and after lockdown.

43 T1D children were recruited (20 female; mean age, 7.45 years; median diabetes duration, 1.05 years). We collected 41,784 hours of CGM data. Although time in range(3.9 – 10.0 mmol/L) was similar before, during, and after lockdown, the median time below range(TBR)<3.9mmol/l decreased from 3.70%(IQR 2.25%,9.53%) before lockdown to

2.91%(IQR 1.43%,5.95%) during lockdown, but reversed to 4.95%(IQR 2.11%,9.42%) after lockdown,(p=0.004). TBR<3.0mmol/l was 0.59%(IQR 0.14%,2.21%), 0.38%(IQR 0.05%,1.35%) and 0.82%(IQR 0.22%,1.69%), respectively(p=0.008). The amelioration in hypoglycemia during lockdown was more prominent among those who had less time spent<3.9mmol/L at baseline. During lockdown, individuals reduced their physical activity, received longer sleep duration, and spent more time on diabetes management. Besides, they attended outpatient clinics less and turned to telemedicine more frequently.

Glycemic control did not deteriorate in T1D children and teenagers around the COVID-19 pandemics. Hypoglycemia declined during lockdown but reversed after lockdown, and the changes related to lifestyle might not provide a long-term effect."

PNAS: Social distancing decreases an individual's likelihood of contracting COVID-19

"Past research has established the value of social distancing as a means of deterring the spread of COVID-19 largely by examining aggregate level data. Locales in which efforts were undertaken to encourage distancing experienced reductions in their rate of transmission. However, these aggregate results tell us little about the effectiveness of social distancing at the level of the individual, which is the question addressed by the current research. Four months after participating in a study assessing their social distancing behavior, 2,120 participants indicated whether they had contracted COVID-19. Importantly, the assessment of social distancing involved not only a self-report measure of how strictly participants had followed social distancing recommendations but also a series of virtual behavior measures of social distancing. These simulations presented participants with graphical depictions mirroring specific real-world scenarios, asking them to position themselves in relation to others in the scene. Individuals' social distancing behavior, particularly as assessed by the virtual behavior measure, predicted whether they contracted COVID-19 during the intervening 4 mo. This was true when considering only participants who reported having tested positively for the virus and when considering additional participants who, although untested, believed that they had contracted the virus. The findings offer a unique form of additional evidence as to why individuals should practice social distancing. What the individual does matters, not only for the health of the collective, but also for the specific individual."

RMD Open: Beneficial effects of colchicine for moderate to severe COVID-19: a randomised, double-blinded, placebo-controlled clinical trial

"We present the results of a randomised, double-blinded, placebo-controlled clinical trial of colchicine for the treatment of moderate to severe COVID-19, with 75 patients allocated 1:1 from 11 April to 30 August 2020. Colchicine regimen was 0.5 mg thrice daily for 5 days, then 0.5 mg twice daily for 5 days. The primary endpoints were the need for supplemental

oxygen, time of hospitalisation, need for admission and length of stay in intensive care unit and death rate.

Seventy-two patients (36 for placebo and 36 for colchicine) completed the study. Median (and IQR) time of need for supplemental oxygen was 4.0 (2.0–6.0) days for the colchicine group and 6.5 (4.0–9.0) days for the placebo group (p<0.001). Median (IQR) time of hospitalisation was 7.0 (5.0–9.0) days for the colchicine group and 9.0 (7.0–12.0) days for the placebo group (p=0.003). At day 2, 67% versus 86% of patients maintained the need for supplemental oxygen, while at day 7, the values were 9% versus 42%, in the colchicine and the placebo groups, respectively (log rank; p=0.001). Two patients died, both in placebo group. Diarrhoea was more frequent in the colchicine group (p=0.26).

Colchicine reduced the length of both, supplemental oxygen therapy and hospitalisation. The drug was safe and well tolerated. Once death was an uncommon event, it is not possible to ensure that colchicine reduced mortality of COVID-19."

Sleep: Sleep and mental health in athletes during COVID-19 lockdown

"The global coronavirus 19 (COVID-19) pandemic and associated lockdown restrictions resulted in the majority of sports competitions around the world being put on hold. This includes the National Basketball Association, the UEFA Champions League, Australian Football League, the Tokyo 2020 Olympic Games, and regional competitions. The mitigation strategies in place to control the pandemic have caused disruption to daily schedules, working environments, and lifestyle factors. Athletes rely on regular access to training facilities, practitioners, and coaches to maintain physical and mental health to achieve maximal performance and optimal recovery. Furthermore, participation in sport at any level increases social engagement and promotes better mental health. It is, therefore, critical to understanding how the COVID-19 pandemic and associated lockdown measures have affected the lives of athletes. We surveyed elite and sub-elite athletes (n = 565) across multiple sports. Significant disruptions were reported for all lifestyle factors including social interactions, physical activity, sleep patterns, and mental health. We found a significant increase in total sleep time and sleep latency, as well as a delay in mid-sleep times and a decrease in social jetlag. Training frequency and duration significantly decreased. Importantly, the changes to training and sleep-related factors were associated with mental health outcomes. With spikes in COVID-19 cases rising around the world and governments reinstituting lockdowns (e.g. United Kingdom; Melbourne, Australia; California, USA) these results will inform messaging and strategies to better manage sleep and mental health in a population for whom optimal performance is critical."

03 February 2021

Wien Klin Wochenschr: Methylprednisolone in adults hospitalized with COVID-19 pneumonia: An open-label randomized trial (GLUCOCOVID)

> "To determine whether a 6-day course of methylprednisolone (MP) improves outcome in patients with severe SARS-CoV-2 (Corona Virus Disease 2019 [COVID-19]).
>
> The study was a multicentric open-label trial of COVID-19 patients who were aged ≥ 18 years, receiving oxygen without mechanical ventilation, and with evidence of systemic inflammatory response who were assigned to standard of care (SOC) or SOC plus intravenous MP (40 mg bid for 3 days followed by 20 mg bid for 3 days). The primary outcome was a composite of death, admission to the intensive care unit, or requirement for noninvasive ventilation. Both intention-to-treat (ITT) and per protocol (PP) analyses were performed.
>
> A total of 91 patients were screened, and 64 were randomized (mean age70 ± 12 years). In the ITT analysis, 14 of 29 patients (48%) in the SOC group and 14 of 35 (40%) in the MP group suffered the composite endpoint (40% versus 20% in patients under 72 years and 67% versus 48% in those over 72 years; p = 0.25). In the PP analysis, patients on MP had a significantly lower risk of experiencing the composite endpoint (age-adjusted risk ratio 0.42; 95% confidence interval, CI 0.20–0.89; p = 0.043).
>
> The planned sample size was not achieved, and our results should therefore be interpreted with caution. The use of MP had no significant effect on the primary endpoint in ITT analysis; however, the PP analysis showed a beneficial effect due to MP, which consistent with other published trials support the use of glucocorticoids in severe cases of COVID-19."

02 February 2021

J Clin Invest: A replication competent adenovirus-vectored influenza vaccine induces durable systemic and mucosal immunity

> "Immunization with replication-competent recombinant vectors provides exposure to transgene-encoded antigens in the context of inflammation that may drive more potent and durable immunity compared to non-replicating vaccines. To understand the features of a replicating vaccine that drive such responses we tested a replication-competent adenovirus type 4 encoding influenza virus H5 hemagglutinin (Ad4-H5-Vtn) administered by an oral capsule or via a tonsillar swab or nasal spray.
>
> Viral shedding from the nose, mouth, and rectum was measured by PCR and culture. H5-specific IgG and IgA antibodies were measured by bead array binding assays. Serum

antibodies were measured by a pseudovirus entry inhibition assay (PVEI), microneutralization (MN), and hemagglutinin inhibition (HAI).

Ad4-H5-Vtn DNA was shed from most upper respiratory tract (URT)-immunized volunteers for 2-4 weeks, but cultured from only 60% of participants with a median duration of one day. Ad4-H5-Vtn vaccination induced increases in H5-specific CD4+ and CD8+ T cells in the peripheral blood and IgG and IgA in nasal, cervical and rectal secretions. URT immunizations induced high levels of serum neutralizing antibodies (NAb) to H5 which remained stable at week 26. The duration of viral shedding correlated with the magnitude of the NAb response at week 26. Adverse events (AE) were mild, and peak NAb titer was associated with overall AE frequency or duration. Serum neutralizing antibody titers could be boosted to very high levels 2-5 years after Ad4-H5-Vtn vaccination with recombinant H5 or inactivated split H5N1 vaccine.

Replicating Ad4 delivered to the URT causes prolonged exposure to antigen, drives durable systemic and mucosal immunity, and is a promising platform for the induction of immunity against viral surface glycoprotein targets."

See also: NIH press release

PLoS One: General medical publications during COVID-19 show increased dissemination despite lower validation

"We performed a cross-sectional bibliometric study of published studies in four high-impact medical journals to identify differences in the characteristics of COVID-19 related publications compared to non-pandemic studies. Original investigations related to SARS-CoV-2 and COVID-19 published in March and April 2020 were identified and compared to non-COVID-19 research publications over the same two-month period in 2019 and 2020. Extracted data included publication characteristics, study characteristics, author characteristics, and impact metrics. Our primary measure was principal component analysis (PCA) of publication characteristics and impact metrics across groups.

We identified 402 publications that met inclusion criteria: 76 were related to COVID-19; 154 and 172 were non-COVID publications over the same period in 2020 and 2019, respectively. PCA utilizing the collected bibliometric data revealed segregation of the COVID-19 literature subset from both groups of non-COVID literature (2019 and 2020). COVID-19 publications were more likely to describe prospective observational (31.6%) or case series (41.8%) studies without industry funding as compared with non-COVID articles, which were represented primarily by randomized controlled trials (32.5% and 36.6% in the non-COVID literature from 2020 and 2019, respectively).

In this cross-sectional study of publications in four general medical journals, COVID-related articles were significantly different from non-COVID articles based on article characteristics

and impact metrics. COVID-related studies were generally shorter articles reporting observational studies with less literature cited and fewer study sites, suggestive of more limited scientific support. They nevertheless had much higher dissemination."

01 February 2021

Physiol Rep: SARS CoV-2 related microvascular damage and symptoms during and after COVID-19: Consequences of capillary transit-time changes, tissue hypoxia and inflammation

"Corona virus disease 2019 (COVID-19) causes symptoms from multiple organs after infection by severe acute respiratory syndrome corona virus 2 (SARS CoV-2). They range from early, low blood oxygen levels (hypoxemia) without breathlessness ("silent hypoxia"), delirium, rashes, and loss of smell (anosmia), to persisting chest pain, muscle weakness and -pain, fatigue, confusion, memory problems and difficulty to concentrate ("brain fog"), mood changes, and unexpected onset of hypertension or diabetes. SARS CoV-2 affects the microcirculation, causing endothelial cell swelling and damage (endotheliitis), microscopic blood clots (microthrombosis), capillary congestion, and damage to pericytes that are integral to capillary integrity and barrier function, tissue repair (angiogenesis), and scar formation. Similar to other instances of critical illness, COVID-19 is also associated with elevated cytokine levels in the systemic circulation.

This review examines how capillary damage and inflammation may contribute to these acute and persisting COVID-19 symptoms by interfering with blood and tissue oxygenation and with brain function. Undetectable by current diagnostic methods, capillary flow disturbances limit oxygen diffusion exchange in lungs and tissue and may therefore cause hypoxemia and tissue hypoxia. The review analyzes the combined effects of COVID-19-related capillary damage, pre-existing microvascular changes, and upstream vascular tone on tissue oxygenation in key organs. It identifies a vicious cycle, as infection- and hypoxia-related inflammation cause capillary function to deteriorate, which in turn accelerates hypoxia-related inflammation and tissue damage. Finally, the review addresses the effects of low oxygen and high cytokine levels in brain tissue on neurotransmitter synthesis and mood. Methods to assess capillary functions in human organs and therapeutic means to protect capillary functions and stimulate capillary bed repair may prove important for the individualized management of COVID-19 patients and targeted rehabilitation strategies."

ICYMI (older than the last 2 weeks)

J Intern Med: Assessment of thirty-day readmission rate, timing, causes and predictors after hospitalization with COVID-19 (online 16 January 2021)

> "There are limited data on the characteristics of 30-day readmission after hospitalization with coronavirus disease 2019 (COVID-19).
>
> To examine the rate, timing, causes, predictors and outcomes of 30-day readmission after COVID-19 hospitalization.
>
> From 13 March to 9 April 2020, all patients hospitalized with COVID-19 and discharged alive were included in this retrospective observational study. Multivariable logistic regression was used to identify the predictors of 30-day readmission, and a restricted cubic spline function was utilized to assess the linearity of the association between continuous predictors and 30-day readmission.
>
> A total of 1062 patients were included in the analysis, with a median follow-up time of 62 days. The mean age of patients was 56.5 years, and 40.5% were women. At the end of the study, a total of 48 (4.5%) patients were readmitted within 30 days of discharge, and a median time to readmission was 5 days. The most common primary diagnosis of 30-day readmission was a hypoxic respiratory failure (68.8%) followed by thromboembolism (12.5%) and sepsis (6.3%). The patients with a peak serum creatinine level of ≥1.29 mg/dL during the index hospitalization, compared to those with a creatinine of <1.29 mg/dL, had 2.4 times increased risk of 30-day readmission (adjusted odds ratio: 2.41; 95% CI: 1.23–4.74). The mortality rate during the readmission was 22.9%.
>
> With 4.5% of the thirty-day readmission rate, COVID-19 survivors were readmitted early after hospital discharge, mainly due to morbidities of COVID-19. One in five readmitted COVID-19 survivors died during their readmission."

Diagnostics: COVID-19 Point-of-Care Diagnostics That Satisfy Global Target Product Profiles (published 12 January 2021)

> "COVID-19 pandemic will continue to pose a major public health threat until vaccination-mediated herd immunity is achieved. Most projections predict vaccines will reach a large subset of the population late in 2021 or early 2022. In the meantime, countries are exploring options to remove strict lockdown measures and allow society and the economy to return to normal function. One possibility is to expand on existing COVID-19 testing strategies by including large-scale rapid point-of-care diagnostic tests (POCTs). Currently, there is significant variability in performance and features of available POCTs, making selection and procurement of an appropriate test for specific use case difficult. In this review, we have used the World Health Organization's (WHO) recently published target product profiles (TPPs) for specific use cases of COVID-19 diagnostic tests to screen for top-

performing POCTs on the market. Several POCTs, based on clinical sensitivity/specificity, the limit of detection, and time to results, which meet WHO TPP criteria for direct detection of SARS-CoV-2 (acute infection) or indirect diagnosis of past infection (host antibodies), are highlighted here."

Endocrinology: Potential Interaction Between SARS-CoV-2 and Thyroid: A Review (online 11 January 2021)

"The novel coronavirus disease 2019 (COVID-19) produced by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is sweeping the world in a very short time. Although much has been learned about the clinical course, prognostic inflammatory markers, and disease complications of COVID-19, the potential interaction between SARS-CoV-2 and the thyroid is poorly understood. In contrast to SARS-CoV-1, limited available evidence indicates there is no pathological evidence of thyroid injury caused by SARS-CoV-2. However, subacute thyroiditis caused by SARS-CoV-2 has been reported for the first time. Thyroid dysfunction is common in patients with COVID-19 infection. By contrast, certain thyroid diseases may have a negative impact on the prevention and control of COVID-19. In addition, some anti–COVID-19 agents may cause thyroid injury or affect its metabolism. COVID-19 and thyroid disease may mutually aggravate the disease burden. Patients with SARS-CoV-2 infection should not ignore the effect on thyroid function, especially when there are obvious related symptoms. In addition, patients with thyroid diseases should follow specific management principles during the epidemic period."

Selected Literature: Preprints

Preprints are found on preprint servers such as arXiv, bioRxiv, and medRxiv; they are commonly used for biomedical research. Preprints may later be published in peer-reviewed journals. Per medRxiv: "Preprints are preliminary reports of work that have not been certified by peer review. They should not be relied on to guide clinical practice or health-related behavior and should not be reported in news media as established information."

medRxiv: Tocilizumab in patients admitted to hospital with COVID-19 (RECOVERY): preliminary results of a randomised, controlled, open-label, platform trial (posted 11 February 2021)

"Findings: Between 23 April 2020 and 25 January 2021, 4116 adults were included in the assessment of tocilizumab, including 562 (14%) patients receiving invasive mechanical ventilation, 1686 (41%) receiving non-invasive respiratory support, and. 1868 (45%) receiving no respiratory support other than oxygen. Median CRP was 143 [IQR 107-205] mg/L and 3385 (82%) patients were receiving systemic corticosteroids at randomisation. Overall, 596 (29%) of the 2022 patients allocated tocilizumab and 694 (33%) of the 2094

patients allocated to usual care died within 28 days (rate ratio 0.86; 95% confidence interval [CI] 0.77-0.96; p=0.007). Consistent results were seen in all pre-specified subgroups of patients, including those receiving systemic corticosteroids. Patients allocated to tocilizumab were more likely to be discharged from hospital alive within 28 days (54% vs. 47%; rate ratio 1.23; 95% CI 1.12-1.34; p<0.0001). Among those not receiving invasive mechanical ventilation at baseline, patients allocated tocilizumab were less likely to reach the composite endpoint of invasive mechanical ventilation or death (33% vs. 38%; risk ratio 0.85; 95% CI 0.78-0.93; p=0.0005).

Interpretation: In hospitalised COVID-19 patients with hypoxia and systemic inflammation, tocilizumab improved survival and other clinical outcomes regardless of the level of respiratory support received and in addition to the use of systemic corticosteroids."

medRxiv: Poor antigen-specific responses to the second BNT162b2 mRNA vaccine dose in SARS-CoV-2-experienced individuals (posted 09 February 2021)

"The advent of COVID-19 vaccines will play a major role in helping to end the pandemic that has killed millions worldwide. Vaccine candidates have demonstrated robust humoral responses and have protected against infection. However, efficacy trials were focused on individuals with no prior exposure to SARS-CoV-2, and, as a result, little is known about immune responses induced by these mRNA vaccines in individuals who recovered from COVID-19. Here, we evaluated immune responses in 32 subjects who received two-dose BNT162b2 mRNA vaccination. In individuals naive to SARS-CoV-2, we observed robust increases in humoral and antigen-specific antibody-secreting cell (ASC) responses following each dose of vaccine, whereas individuals with prior exposure to SARS-CoV-2 demonstrated strong humoral and antigen-specific ASC responses responses to the first dose but muted responses to the second dose of the vaccine for the time points studied. These data highlight an important gap in our knowledge and may have major implications for how these vaccines should be used to prevent COVID-19."

PsyArXiv: Communicate Hope to Motivate Action Against Highly Infectious SARS-CoV-2 Variants (posted 09 February 2021)

"The world is facing a race between controlling new and more infectious variants of coronavirus and implementing vaccinations: How can health authorities and governments most effectively communicate the need to engage more strongly in protective behavior to avoid a collapse of the healthcare system until vaccination programs are effective? In the first wave of the pandemic, citizens became engaged in 'flattening the curve' via powerful visualizations. Here, we use epidemiological modelling to develop a new visual communication aid, 'buying time with hope', which reflects the pandemic trade-offs currently facing governments, authorities and citizens. Using a population-based experiment conducted in United States (N = 3,022), we demonstrate that this hope-oriented

visual communication aid, depicting the competing effects on the epidemic curve of (1) more infectious variants and (2) vaccinations, motivates public action and communicates more effectively than fear-oriented visual communication, focusing exclusively on the threat of the new variants. Finally, using cross-national representative surveys from eight countries (N = 3,995), we document the urgent need to motivate public action to halt the spread of the new, more infectious variants. These findings not only provide public health authorities globally with a validated blueprint for health communication in a critical period of the pandemic but also provide general psychological insights into the importance of hope as a health communication strategy."

medRxiv: Symptoms of COVID-19 infection and magnitude of antibody response in a large community-based study (08 February 2021)

"Background The majority of COVID-19 cases are asymptomatic, or minimally symptomatic with management in the home. Little is known about the frequency of specific symptoms in the general population, and how symptoms predict the magnitude of antibody response to SARS-CoV-2 infection. Methods We quantified IgG antibodies against the SARS-CoV-2 receptor binding domain (RBD) in home-collected dried blood spot samples from 3,365 adults participating in a community-based seroprevalence study in the city of Chicago, USA, collected between June 24 and November 11, 2020. Results 17.8% of the sample was seropositive for SARS-CoV-2. A cluster of symptoms (loss of sense of smell or taste, fever, shortness of breath, muscle or body aches, cough, fatigue, diarrhea, headache) was associated with stronger anti-RBD IgG responses among the seropositives. 39.2% of infections were asymptomatic, and 2 or fewer symptoms were reported for 66.7% of infections. Total number of symptoms was positively but weakly associated with IgG response: Median anti-RBD IgG was 0.95 ug/mL for individuals with 3 or more symptoms, in comparison with 0.61 ug/mL for asymptomatic infections. Conclusion We document high rates of asymptomatic and mild infection in a large community-based cohort, and relatively low levels of anti-SARS-CoV-2 IgG antibody in the general population of previously exposed individuals."

medRxiv: SARS-CoV-2 Transmission Risk from sports Equipment (STRIKE) (08 February 2021)

"OBJECTIVES: To investigate the potential of shared sporting equipment as transmission vectors of SARS-CoV-2 during the reintroduction of sports such as soccer, rugby, cricket, tennis, golf and gymnastics. SETTING: Laboratory based live SARS-CoV-2 virus study.

INTERVENTIONS: Ten different types of sporting equipment were inoculated with 40µl droplets containing clinically relevant high and low concentrations of live SARS-CoV-2 virus. Materials were then swabbed at time points relevant to sports (1, 5, 15, 30, 90 minutes). The amount of live SARS-CoV-2 recovered at each time point was enumerated using viral plaque assays, and viral decay and half-life was estimated through fitting linear models to

log transformed data from each material. MAIN OUTCOME MEASURE: The primary outcome measure was quantification of retrievable SARS-CoV-2 virus from each piece of equipment at pre-determined time points.

RESULTS: At one minute, SARS-CoV-2 virus was recovered in only seven of the ten types of equipment with the low dose inoculum, one at five minutes and none at 15 minutes. Retrievable virus dropped significantly for all materials tested using the high dose inoculum with mean recovery of virus falling to 0.74% at 1 minute, 0.39% at 15 minutes and 0.003% at 90 minutes. Viral recovery, predicted decay, and half-life varied between materials with porous surfaces limiting virus transmission.

CONCLUSIONS: This study shows that there is an exponential reduction in SARS-CoV-2 recoverable from a range of sports equipment after a short time period, and virus is less transferrable from materials such as a tennis ball, red cricket ball and cricket glove. Given this rapid loss of viral load and the fact that transmission requires a significant inoculum to be transferred from equipment to the mucous membranes of another individual it seems unlikely that sports equipment is a major cause for transmission of SARS-CoV-2. These findings have important policy implications in the context of the pandemic and may promote other infection control measures in sports to reduce the risk of SARS-CoV-2 transmission and urge sports equipment manufacturers to identify surfaces that may or may not be likely to retain transferable virus."

medRxiv: Genomic epidemiology identifies emergence and rapid transmission of SARS-CoV-2 B.1.1.7 in the United States (07 February 2021)

"As of January of 2021, the highly transmissible B.1.1.7 variant of SARS-CoV-2, which was first identified in the United Kingdom (U.K.), has gained a strong foothold across the world. Because of the sudden and rapid rise of B.1.1.7, we investigated the prevalence and growth dynamics of this variant in the United States (U.S.), tracking it back to its early emergence and onward local transmission. We found that the RT-qPCR testing anomaly of S gene target failure (SGTF), first observed in the U.K., was a reliable proxy for B.1.1.7 detection. We sequenced 212 B.1.1.7 SARS-CoV-2 genomes collected from testing facilities in the U.S. from December 2020 to January 2021. We found that while the fraction of B.1.1.7 among SGTF samples varied by state, detection of the variant increased at a logistic rate similar to those observed elsewhere, with a doubling rate of a little over a week and an increased transmission rate of 35-45%. By performing time-aware Bayesian phylodynamic analyses, we revealed several independent introductions of B.1.1.7 into the U.S. as early as late November 2020, with onward community transmission enabling the variant to spread to at least 30 states as of January 2021. Our study shows that the U.S. is on a similar trajectory as other countries where B.1.1.7 rapidly became the dominant SARS-CoV-2 variant, requiring immediate and decisive action to minimize COVID-19 morbidity and mortality."

medRxiv: Antibody responses boosted in seropositive healthcare workers after single dose of SARS-CoV-2 mRNA vaccine (05 February 2021)

> "Current guidelines recommend that individuals who have had COVID-19 should receive the identical vaccine regimen as those who have not had the infection. This includes two doses of the mRNA platform vaccines (BNT162b2/Pfizer; mRNA-1273/Moderna) that are approved for use in the United States. In this brief report, we show that after a single dose of the Pfizer SARS-CoV-2 vaccine, individuals that had prior SARS-CoV-2 infection had significantly higher antibody levels than individuals that had no history of infection. This provides the rationale for changing vaccination policy to deliver only a single dose to individuals with recent SARS-CoV-2 infection that may free up additional doses for individuals that have no preexisting immunity to the virus. Future study of other immune parameters such as T cell response and durability of immune response should be rapidly undertaken in individuals that had COVID-19 prior to vaccination."

medRxiv: Can a COVID-19 vaccination program guarantee the return to a pre-pandemic lifestyle? (05 February 2021)

> "COVID-19 vaccination has been initiated in several countries to control SARS-CoV-2 transmission. Whether and when non-pharmaceutical interventions (NPIs) can be lifted as vaccination builds up remains key questions. To address them, we built a data-driven SARS-CoV-2 transmission model for China. We estimated that, to prevent local outbreaks to escalate to major widespread epidemics, stringent NPIs need to remain in place at least one year after the start of vaccination. Should NPIs be capable to keep the reproduction number (Rt) around 1.3, vaccination could reduce up to 99% of COVID-19 burden and bring Rt below the epidemic threshold in 9 months. Maintaining strict NPIs throughout 2021 is of paramount importance to reduce COVID-19 burden while vaccines are distributed, especially in large populations with little natural immunity."

medRxiv: Estimating the effectiveness of the Pfizer COVID-19 BNT162b2 vaccine after a single dose. A reanalysis of a study of 'real-world' vaccination outcomes from Israel (posted 03 February 2021)

> "A distinctive feature of the roll out of vaccination against SARS-CoV-2 virus in the UK was the decision to delay the timing of the second injection till 12 weeks after the first. The logic behind this is to protect more people sooner and so reduce the total number of severe infections, hospitalisations, and deaths. This decision caused criticism from some quarters due in part to a belief that a single injection may not give adequate immunity. A recent paper based on Israel's experience of vaccination suggested that a single dose may not provide adequate protection. Here we extract the primary data from the Israeli paper and then estimate the incidence per day for each day after the first injection and also estimate vaccine effectiveness for each day from day 13 to day 24. We used a pooled estimate of the

daily incidence rate during days 1 to 12 as the counterfactual estimate of incidence without disease and estimated confidence intervals using Monte Carlo modelling. After initial injection case numbers increased to day 8 before declining to low levels by day 21. Estimated vaccine effectiveness was pretty much 0 at day 14 but then rose to about 90% at day 21 before levelling off. The cause of the initial surge in infection risk is unknown but may be related to people being less cautious about maintaining protective behaviours as soon as they have the injection. What our analysis shows is that a single dose of vaccine is highly protective, although it can take up to 21 days to achieve this. The early results coming from Israel support the UK policy of extending the gap between doses by showing that a single dose can give a high level of protection."

News in Brief

"Covid-19 cases are falling in the U.S. It could be a calm before a variant-driven storm" (STAT).

Fun fact: All the SARS-CoV-2 virus in the world would fit in a coke can (Reuters).

The New Variants

The South Africa variant has been detected in a California case (Politico).

Germany is extending its pandemic until March 7 because of fears that the spread of coronavirus variants will undermine progress against the virus (Reuters).

"The fast-spreading coronavirus variant is turning up in US sewers" (MIT Tech Rev).

Podcast (18 mins): "Variants – what you need to know: Researchers are scrambling to understand the biology of new coronavirus variants and the impact they might have on vaccine efficacy" (Nature).

Transmission, Testing, and Mitigation Measures

In a recent press conference, the WHO team looking for the source of the coronavirus dismissed the lab leak theory, but admitted that the origin is still unknown (WashPo).

Vaccines are not enough; we need new treatments, and we need them fast (SciAm).

"Rapid coronavirus tests: a guide for the perplexed" (Nature).

At the risk of showing a canine bias… "A German veterinary clinic has trained sniffer dogs to detect the novel coronavirus in human saliva samples with 94% accuracy" (Reuters).

Vaccines

The FDA has scheduled its Vaccines and Related Biological Products Advisory Committee meeting to discuss the Johnson & Johnson / Janssen COVI-19 vaccine for possible EUA for Friday, 26 February 2021 (FDA).

After receiving AstraZeneca's COVID vaccine, South Africa halted distribution because of concerns of lower clinical efficacy against the B.1.351 variant (STAT).

"Trust in COVID vaccines is growing: Survey spanning several countries finds encouraging trends, but researchers warn vaccine hesitancy could slow pandemic recovery" (Nature).

According to a new poll, while 67% of Americans say they plan to get a COVID vaccine, 15% are certain they won't and 17% say they probably won't – mainly because they have doubts about safety and effectiveness (AP).

Thanks, Coronavirus

New data from the REACT study suggest a wider set of symptoms with coronavirus infection than previously thought (ICL; see also: full report).

We don't know how many reinfections with COVID-19 are happening in the US because we aren't looking for or tracking that data (KHN).

Yet another potential worry with COVID-19: could the virus persist at subzero temperatures and impact cryostored eggs or embryos and impact fertility treatments? (J Assist Reprod Genet).

Long Reads

"'A huge potential for chaos': How the COVID-19 vaccine rollout was hobbled by turf wars and magical thinking" (VF).

"A lone infection may have changed the course of the pandemic: The number of mutations in the UK variant took scientists by surprise. Now they think its origins may lie in one person, chronically infected with the virus" (Wired).

"What if we never reach herd immunity? Hitting the threshold might actually be impossible. But vaccines can still help end the pandemic" (Atlantic).

Other Outbreaks and Infectious Diseases

A new case of Ebola has been found in a northern area of the Democratic Republic of the Congo (WHO).

USAMRIID released a new mobile app – the Biodefense Tool provides key information presented in training and education courses and serves as a quick reference (USAMRIID).

References

Statistics

JHU CSSE: Johns Hopkins Center for Systems Science and Engineering. Coronavirus COVID-19 Global Cases. Link: https://coronavirus.jhu.edu/map.html

VA DOH: Virginia Department of Health. COVID-19 in Virginia. Link: http://www.vdh.virginia.gov/coronavirus/

Special Reports

JHCHS: Johns Hopkins Center for Health Security. Schoch-Spana M, Brunson E, Hosangadi D, Long R, Ravi S, Taylor M, Trotochaud M, Veenema TG on behalf of the Working Group on Equity in COVID-19. Equity in Vaccination: A Plan to Work with Communities of Color Toward COVID-19 Recovery and Beyond (posted 09 February 2021). Link: https://www.centerforhealthsecurity.org/our-work/publications/equity-in-vaccination

Selected Literature: Peer-Reviewed Journals

Acta Paediatr: Gavish R, Levinsky Y, Dizitzer Y, Bilavsky E, Livni G, Pirogovsky A, Scheuerman O, Krause I. The COVID-19 pandemic dramatically reduced admissions of children with and without chronic conditions to general paediatric wards. Acta Paediatr. 2021 Feb 4. doi: 10.1111/apa.15792. Epub ahead of print. PMID: 33539565. Link: https://onlinelibrary.wiley.com/doi/10.1111/apa.15792

Age Ageing: Geriatric Medicine Research Collaborative. Age and frailty are independently associated with increased COVID-19 mortality and increased care needs in survivors: results of an international multi-centre study. Age Ageing. 2021 Feb 5:afab026. doi: 10.1093/ageing/afab026. Epub ahead of print. PMID: 33543243. Link: https://academic.oup.com/ageing/advance-article/doi/10.1093/ageing/afab026/6128535

AIDS Rev: Griffin DO, Brennan-Rieder D, Ngo B, Kory P, Confalonieri M, Shapiro L, Iglesias J, Dube M, Nanda N, In GK, Arkfeld D, Chaudhary P, Campese VM, Hanna DL, Sawcer D, Ehresmann G, Peng D, Smorgorzewski M, Amstrong A, Vinjevoll EH, Dasgupta R, Sattler FR, Mussini C, Mitjà O, Soriano V, Peschanski N, Hayem G, Piccirillo MC, Lobo-Ferreira A, Rivero IB, Hung IFH, Rendell M, Ditmore S, Varon J, Marik P. The Importance of Understanding the Stages of COVID-19 in Treatment and Trials. AIDS Rev. 2021 Feb 8. doi: 10.24875/AIDSRev.200001261. Epub ahead of print. PMID: 33556957. Link: https://www.aidsreviews.com/resumen.php?id=1567&indice=2020224&u=unp

Alzheimers Dementia: Wang QQ, Davis PB, Gurney ME, Xu R. COVID-19 and dementia: Analyses of risk, disparity, and outcomes from electronic health records in the US. Alzheimers Dementia First published: 09 February 2021 https://doi.org/10.1002/alz.12296 Link: https://alz-journals.onlinelibrary.wiley.com/doi/10.1002/alz.12296

BMC Med: Muldoon KA, Denize KM, Talarico R, Fell DB, Sobiesiak A, Heimerl M, Sampsel K. COVID-19 pandemic and violence: rising risks and decreasing urgent care-seeking for sexual assault and domestic violence survivors. BMC Med. 2021 Feb 5;19(1):20. doi: 10.1186/s12916-020-01897-z. PMID: 33541357; PMCID: PMC7861965. Link: https://bmcmedicine.biomedcentral.com/articles/10.1186/s12916-020-01897-z

Clin Exp Med: Pepe M, Maroun-Eid C, Romero R, Arroyo-Espliguero R, Fernàndez-Rozas I, Aparisi A, Becerra-Muñoz VM, Garcìa Aguado M, Brindicci G, Huang J, Alfonso-Rodríguez E, Castro-Mejía AF, Favretto S, Cerrato E, Albiol P, Raposeiras-Roubin S, Vedia O, Feltes Guzmãn G, Carrero-Fernández A, Perez Cimarra C, Buzón L, Jativa Mendez JL, Abumayyaleh M, Corbi-Pascual M, Macaya C, Estrada V, Nestola PL, Biondi-Zoccai G, Núñez-Gil IJ. Clinical presentation, therapeutic approach, and outcome of young patients admitted for COVID-19, with respect to the elderly counterpart. Clin Exp Med. 2021 Feb 8:1–20. doi: 10.1007/s10238-021-00684-1. Epub ahead of print. PMID: 33555436; PMCID: PMC7868661. Link: https://link.springer.com/article/10.1007/s10238-021-00684-1

Clin Infect Dis: Dugdale CM, Rubins DM, Lee H, McCluskey SM, Ryan ET, Kotton CN, Hurtado RM, Ciaranello AL, Barshak MB, McEvoy DS, Nelson SB, Basgoz N, Lazarus JE, Ivers LC, Reedy JL, Hysell KM, Lemieux JE, Heller HM, Dutta S, Albin JS, Brown TS, Miller AL, Calderwood SB, Walensky RP, Zachary KC, Hooper DC, Hyle EP, Shenoy ES. COVID-19 Diagnostic Clinical Decision Support: a Pre-Post Implementation Study of CORAL (COvid Risk cALculator). Clin Infect Dis. 2021 Feb 10:ciab111. doi: 10.1093/cid/ciab111. Epub ahead of print. PMID: 33564833. Link: https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciab111/6132091

Clin Infect Dis: Rebeiro PF, Aronoff DM, Smith MK. The Impact of State Mask-Wearing Requirements on the Growth of COVID-19 Cases in the United States. Clin Infect Dis. 2021 Feb 7:ciab101. doi: 10.1093/cid/ciab101. Epub ahead of print. PMID: 33550400. Link: https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciab101/6129930

Clin Infect Dis: Zucman N, Uhel F, Descamps D, Roux D, Ricard JD. Severe reinfection with South African SARS-CoV-2 variant 501Y.V2: A case report. Clin Infect Dis. 2021 Feb 10:ciab129. doi: 10.1093/cid/ciab129. Epub ahead of print. PMID: 33566076. Link: https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciab129/6132402

CMAJ: Verma AA, Hora T, Jung HY, Fralick M, Malecki SL, Lapointe-Shaw L, Weinerman A, Tang T, Kwan JL, Liu JJ, Rawal S, Chan TCY, Cheung AM, Rosella LC, Ghassemi M, Herridge M, Mamdani M, Razak F. Characteristics and outcomes of hospital admissions for COVID-19 and influenza in the Toronto area. CMAJ. 2021 Feb 10:cmaj.202795. doi: 10.1503/cmaj.202795.

Epub ahead of print. PMID: 33568436. Link: https://www.cmaj.ca/content/early/2021/02/10/cmaj.202795

Diagnostics: Ghaffari A, Meurant R, Ardakani A. COVID-19 Point-of-Care Diagnostics That Satisfy Global Target Product Profiles. Diagnostics (Basel). 2021 Jan 12;11(1):115. doi: 10.3390/diagnostics11010115. PMID: 33445727; PMCID: PMC7828180. Link: https://www.mdpi.com/2075-4418/11/1/115

Endocrinology: Chen W, Tian Y, Li Z, Zhu J, Wei T, Lei J. Potential Interaction Between SARS-CoV-2 and Thyroid: A Review. Endocrinology. 2021 Mar 1;162(3):bqab004. doi: 10.1210/endocr/bqab004. PMID: 33543236. Link: https://academic.oup.com/endo/article/162/3/bqab004/6082366

Eur Heart J: Sultanian P, Lundgren P, Strömsöe A, Aune S, Bergström G, Hagberg E, Hollenberg J, Lindqvist J, Djärv T, Castelheim A, Thorén A, Hessulf F, Svensson L, Claesson A, Friberg H, Nordberg P, Omerovic E, Rosengren A, Herlitz J, Rawshani A. Cardiac arrest in COVID-19: characteristics and outcomes of in- and out-of-hospital cardiac arrest. A report from the Swedish Registry for Cardiopulmonary Resuscitation. Eur Heart J. 2021 Feb 5:ehaa1067. doi: 10.1093/eurheartj/ehaa1067. Epub ahead of print. PMID: 33543259. Link: https://academic.oup.com/eurheartj/advance-article/doi/10.1093/eurheartj/ehaa1067/6128749

Immunity: Bonifacius A, Tischer-Zimmermann S, Dragon AC, Gussarow D, Vogel A, Krettek U, Gödecke N, Yilmaz M, Kraft ARM, Hoeper MM, Pink I, Schmidt JJ, Li Y, Welte T, Maecker-Kolhoff B, Martens J, Berger MM, Lobenwein C, Stankov MV, Cornberg M, David S, Behrens GMN, Witzke O, Blasczyk R, Eiz-Vesper B. COVID-19 immune signatures reveal stable antiviral T cell function despite declining humoral responses. Immunity. 2021 Jan 27;54(2):340–354.e6. doi: 10.1016/j.immuni.2021.01.008. Epub ahead of print. PMID: 33567252; PMCID: PMC7871825. Link: https://www.cell.com/immunity/fulltext/S1074-7613(21)00031-5

Int Forum Allergy Rhinol: Lucidi D, Molinari G, Silvestri M, De Corso E, Guaraldi G, Mussini C, Presutti L, Fernandez IJ. Patient-reported olfactory recovery after SARS-CoV-2 infection: A 6-month follow-up study. Int Forum Allergy Rhinol. 2021 Feb 4. doi: 10.1002/alr.22775. Epub ahead of print. PMID: 33539667. Link: https://onlinelibrary.wiley.com/doi/10.1002/alr.22775

J Clin Invest: Matsuda K, Migueles SA, Huang J, Bolkhovitinov L, Stuccio S, Griesman T, Pullano AA, Kang BH, Ishida E, Zimmerman M, Kashyap N, Martins KM, Stadlbauer D, Pederson J, Patamawenu A, Wright NE, Shofner T, Evans S, Liang CJ, Candia J, Biancotto A, Fantoni G, Poole A, Smith J, Alexander J, Gurwith M, Krammer F, Connors M. A replication competent adenovirus-vectored influenza vaccine induces durable systemic and mucosal immunity. J Clin Invest. 2021 Feb 2:140794. doi: 10.1172/JCI140794. Epub ahead of print. PMID: 33529172. Link: https://www.jci.org/articles/view/140794

J Diabetes Investig: Wu X, Luo S, Zheng X, Ding Y, Wang S, Ling P, Yue T, Xu W, Yan J, Weng J. Glycemic control in type 1 diabetes children and teenagers around lockdown for COVID-19: a continuous glucose monitoring based observational study. J Diabetes Investig. 2021 Feb 4. doi: 10.1111/jdi.13519. Epub ahead of print. PMID: 33539665. Link: https://onlinelibrary.wiley.com/doi/10.1111/jdi.13519

J Intern Med: Yeo I, Baek S, Kim J, Elshakh H, Voronina A, Lou MS, Vapnik J, Kaler R, Dai X, Goldbarg S. Assessment of thirty-day readmission rate, timing, causes and predictors after hospitalization with COVID-19. J Intern Med. 2021 Jan 16. doi: 10.1111/joim.13241. Epub ahead of print. PMID: 33452824. Link: https://onlinelibrary.wiley.com/doi/10.1111/joim.13241

JAMA Netw Open: Ammassari A, Di Filippo A, Trotta MP, Traversa G, Pierantozzi A, Trotta F, Magrini N. Comparison of Demand for Drugs Used for COVID-19 Treatment and Other Drugs During the Early Phase of the COVID-19 Pandemic in Italy. JAMA Netw Open. 2021 Feb 1;4(2):e2037060. doi: 10.1001/jamanetworkopen.2020.37060. PMID: 33555328. Link: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2776016

JAMA Netw Open: Rauch JN, Valois E, Ponce-Rojas JC, Aralis Z, Lach RS, Zappa F, Audouard M, Solley SC, Vaidya C, Costello M, Smith H, Javanbakht A, Malear B, Polito L, Comer S, Arn K, Kosik KS, Acosta-Alvear D, Wilson MZ, Fitzgibbons L, Arias C. Comparison of Severe Acute Respiratory Syndrome Coronavirus 2 Screening Using Reverse Transcriptase-Quantitative Polymerase Chain Reaction or CRISPR-Based Assays in Asymptomatic College Students. JAMA Netw Open. 2021 Feb 1;4(2):e2037129. doi: 10.1001/jamanetworkopen.2020.37129. PMID: 33570576. Link: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2776173

JAMA Netw Open: Rogawski McQuade ET, Guertin KA, Becker L, Operario D, Gratz J, Guan D, Khan F, White J, McMurry TL, Shah B, Garofalo S, Southerland M, Bear K, Brush J, Allen C, Frayser A, Vokes R, Pershad R, Peake L, deFilippi C, Barackman K, Bearman G, Bidanset A, Farrell F, Trump D, Houpt ER. Assessment of Seroprevalence of SARS-CoV-2 and Risk Factors Associated With COVID-19 Infection Among Outpatients in Virginia. JAMA Netw Open. 2021 Feb 1;4(2):e2035234. doi: 10.1001/jamanetworkopen.2020.35234. PMID: 33555331. Link: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2776019

Lancet Child Adolesc Health: Lachassinne E, de Pontual L, Caeris M, et al. SARS-CoV-2 transmission among children and staff in daycare centres during a nationwide lockdown in France: a cross-sectional, multicentre, seroprevalence study. Published: February 08, 2021 DOI: https://doi.org/10.1016/S2352-4642(21)00024-9 Link: https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(21)00024-9/fulltext

Lancet Respir Med: Feld JJ, Kandel C, Biondi MJ, Kozak RA, Zahoor MA, Lemieux C, Borgia SM, Boggild AK, Powis J, McCready J, Tan DHS, Chan T, Coburn B, Kumar D, Humar A, Chan A, O'Neil B, Noureldin S, Booth J, Hong R, Smookler D, Aleyadeh W, Patel A, Barber B, Casey J, Hiebert R, Mistry H, Choong I, Hislop C, Santer DM, Lorne Tyrrell D, Glenn JS, Gehring AJ, Janssen HLA,

Hansen BE. Peginterferon lambda for the treatment of outpatients with COVID-19: a phase 2, placebo-controlled randomised trial. Lancet Respir Med. 2021 Feb 5:S2213-2600(20)30566-X. doi: 10.1016/S2213-2600(20)30566-X. Epub ahead of print. PMID: 33556319. Link: https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(20)30566-X/fulltext

mBio: Pace RM, Williams JE, Jarvinen KM, et al. Characterization of SARS-CoV-2 RNA, Antibodies, and Neutralizing Capacity in Milk Produced by Women with COVID-19. mBio Feb 2021, 12 (1) e03192-20; DOI: 10.1128/mBio.03192-20 Link: https://mbio.asm.org/content/12/1/e03192-20

MMWR: Brooks JT, Beezhold DH, Noti JD, et al. Maximizing Fit for Cloth and Medical Procedure Masks to Improve Performance and Reduce SARS-CoV-2 Transmission and Exposure, 2021. MMWR Morb Mortal Wkly Rep. ePub: 10 February 2021. DOI: http://dx.doi.org/10.15585/mmwr.mm7007e1 Link: https://www.cdc.gov/mmwr/volumes/70/wr/mm7007e1.htm

MMWR: Joo H, Miller GF, Sunshine G, et al. Decline in COVID-19 Hospitalization Growth Rates Associated with Statewide Mask Mandates — 10 States, March–October 2020. MMWR Morb Mortal Wkly Rep. ePub: 5 February 2021. DOI: http://dx.doi.org/10.15585/mmwr.mm7006e2 Link: https://www.cdc.gov/mmwr/volumes/70/wr/mm7006e2.htm

MMWR: Nguyen KH, Srivastav A, Razzaghi H, et al. COVID-19 Vaccination Intent, Perceptions, and Reasons for Not Vaccinating Among Groups Prioritized for Early Vaccination — United States, September and December 2020. MMWR Morb Mortal Wkly Rep. ePub: 9 February 2021. DOI: http://dx.doi.org/10.15585/mmwr.mm7006e3 Link: https://www.cdc.gov/mmwr/volumes/70/wr/mm7006e3.htm

Nat Hum Behav: Loomba S, de Figueiredo A, Piatek SJ, de Graaf K, Larson HJ. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. Nat Hum Behav. 2021 Feb 5. doi: 10.1038/s41562-021-01056-1. Epub ahead of print. PMID: 33547453. Link: https://www.nature.com/articles/s41562-021-01056-1

Nat Med: Xie X, Liu Y, Liu J, et al. Neutralization of SARS-CoV-2 spike 69/70 deletion, E484K and N501Y variants by BNT162b2 vaccine-elicited sera. a. Nat Med (published 08 February 2021). https://doi.org/10.1038/s41591-021-01270-4 Link: https://www.nature.com/articles/s41591-021-01270-4

npj Digit Med: Lampos V, Majumder MS, Yom-Tov E, et al. Tracking COVID-19 using online search. npj Digit. Med. 4, 17 (2021). https://doi.org/10.1038/s41746-021-00384-w Link: https://www.nature.com/articles/s41746-021-00384-w

Phys Fluids: Chatterjee S, Murallidharan JS, Agrawal A, Bhardwaj R. Why coronavirus survives longer on impermeable than porous surfaces. Phys Fluids 33, 021701 (2021); https://doi.org/10.1063/5.0037924 Link: https://aip.scitation.org/doi/10.1063/5.0037924

Phys Fluids: Liu H, He S, Shen L, Hong J. Simulation-based study of COVID-19 outbreak associated with air-conditioning in a restaurant Phys Fluids 33, 023301 (2021); https://doi.org/10.1063/5.0040188 Link: https://aip.scitation.org/doi/10.1063/5.0040188

Physiol Rep: Østergaard L. SARS CoV-2 related microvascular damage and symptoms during and after COVID-19: Consequences of capillary transit-time changes, tissue hypoxia and inflammation. Physiol Rep. 2021 Feb;9(3):e14726. doi: 10.14814/phy2.14726. PMID: 33523608; PMCID: PMC7849453. Link: https://physoc.onlinelibrary.wiley.com/doi/10.14814/phy2.14726

PLoS One: Gai N, Aoyama K, Faraoni D, Goldenberg NM, Levin DN, Maynes JT, McVey MJ, Munshey F, Siddiqui A, Switzer T, Steinberg BE. General medical publications during COVID-19 show increased dissemination despite lower validation. PLoS One. 2021 Feb 2;16(2):e0246427. doi: 10.1371/journal.pone.0246427. PMID: 33529266; PMCID: PMC7853485. Link: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0246427

PNAS: Edwards DA, Ausiello D, Salzman J, Devlin T, Langer R, Beddingfield BJ, Fears AC, Doyle-Meyers LA, Redmann RK, Killeen SZ, Maness NJ, Roy CJ. Exhaled aerosol increases with COVID-19 infection, age, and obesity. Proc Natl Acad Sci U S A. 2021 Feb 23;118(8):e2021830118. doi: 10.1073/pnas.2021830118. PMID: 33563754. Link: https://www.pnas.org/content/118/8/e2021830118

PNAS: Fazio RH, Ruisch BC, Moore CA, Granados Samayoa JA, Boggs ST, Ladanyi JT. Social distancing decreases an individual's likelihood of contracting COVID-19. Proc Natl Acad Sci U S A. 2021 Feb 23;118(8):e2023131118. doi: 10.1073/pnas.2023131118. PMID: 33542156. Link: https://www.pnas.org/content/118/8/e2023131118

PNAS: Subramanian R, He Q, Pascual M. Quantifying asymptomatic infection and transmission of COVID-19 in New York City using observed cases, serology, and testing capacity. Proc Natl Acad Sci U S A. 2021 Mar 2;118(9):e2019716118. doi: 10.1073/pnas.2019716118. PMID: 33571106. Link: https://www.pnas.org/content/118/9/e2019716118

RMD Open: Lopes MI, Bonjorno LP, Giannini MC, Amaral NB, Menezes PI, Dib SM, Gigante SL, Benatti MN, Rezek UC, Emrich-Filho LL, Sousa BAA, Almeida SCL, Luppino Assad R, Veras FP, Schneider A, Rodrigues TS, Leiria LOS, Cunha LD, Alves-Filho JC, Cunha TM, Arruda E, Miranda CH, Pazin-Filho A, Auxiliadora-Martins M, Borges MC, Fonseca BAL, Bollela VR, Del-Ben CM, Cunha FQ, Zamboni DS, Santana RC, Vilar FC, Louzada-Junior P, Oliveira RDR. Beneficial effects of colchicine for moderate to severe COVID-19: a randomised, double-blinded, placebo-controlled clinical trial. RMD Open. 2021 Feb;7(1):e001455. doi: 10.1136/rmdopen-2020-001455. PMID: 33542047. Link: https://rmdopen.bmj.com/content/7/1/e001455

Science: Dan JM, Mateus J, Kato Y, Hastie KM, Yu ED, Faliti CE, Grifoni A, Ramirez SI, Haupt S, Frazier A, Nakao C, Rayaprolu V, Rawlings SA, Peters B, Krammer F, Simon V, Saphire EO, Smith DM, Weiskopf D, Sette A, Crotty S. Immunological memory to SARS-CoV-2 assessed for up to 8

months after infection. Science. 2021 Feb 5;371(6529):eabf4063. doi: 10.1126/science.abf4063. Epub 2021 Jan 6. PMID: 33408181. Link: https://science.sciencemag.org/content/371/6529/eabf4063.long

Sleep: Facer-Childs ER, Hoffman D, Tran JN, Drummond SPA, Rajaratnam SMW. Sleep and mental health in athletes during COVID-19 lockdown. Sleep. 2021 Feb 4:zsaa261. doi: 10.1093/sleep/zsaa261. Epub ahead of print. PMID: 33535229. Link: https://academic.oup.com/sleep/advance-article/doi/10.1093/sleep/zsaa261/6104495

Wien Klin Wochenschr: Corral-Gudino L, Bahamonde A, Arnaiz-Revillas F, Gómez-Barquero J, Abadía-Otero J, García-Ibarbia C, Mora V, Cerezo-Hernández A, Hernández JL, López-Muñíz G, Hernández-Blanco F, Cifrián JM, Olmos JM, Carrascosa M, Nieto L, Fariñas MC, Riancho JA; GLUCOCOVID investigators. Methylprednisolone in adults hospitalized with COVID-19 pneumonia: An open-label randomized trial (GLUCOCOVID). Wien Klin Wochenschr. 2021 Feb 3:1–9. doi: 10.1007/s00508-020-01805-8. Epub ahead of print. PMID: 33534047; PMCID: PMC7854876. Link: https://link.springer.com/article/10.1007%2Fs00508-020-01805-8

Selected Literature: Preprints

medRxiv: Bradley T, Grundberg E, CODIEFY study team, Selvarangan R. Antibody responses boosted in seropositive healthcare workers after single dose of SARS-CoV-2 mRNA vaccine (05 February 2021). medRxiv 2021.02.03.21251078; doi: https://doi.org/10.1101/2021.02.03.21251078 Link: https://www.medrxiv.org/content/10.1101/2021.02.03.21251078v1

medRxiv: Edwards T, Kay GA, Aljayyoussi G, et al. SARS-CoV-2 Transmission Risk from sports Equipment (STRIKE) (08 February 2021). medRxiv 2021.02.04.21251127; doi: https://doi.org/10.1101/2021.02.04.21251127 Link: https://www.medrxiv.org/content/10.1101/2021.02.04.21251127v1

medRxiv: Horby PW, Campbell M, Staplin N, et al. Tocilizumab in patients admitted to hospital with COVID-19 (RECOVERY): preliminary results of a randomised, controlled, open-label, platform trial (posted 11 February 2021). medRxiv 2021.02.11.21249258; doi: https://doi.org/10.1101/2021.02.11.21249258 Link: https://www.medrxiv.org/content/10.1101/2021.02.11.21249258v1

medRxiv: Hunter PR, Brainard J. Estimating the effectiveness of the Pfizer COVID-19 BNT162b2 vaccine after a single dose. A reanalysis of a study of 'real-world' vaccination outcomes from Israel (posted 03 February 2021). medRxiv 2021.02.01.21250957; doi: https://doi.org/10.1101/2021.02.01.21250957 Link: https://www.medrxiv.org/content/10.1101/2021.02.01.21250957v1

medRxiv: McDade TW, Schrock J, D'Aquila R, et al. Symptoms of COVID-19 infection and magnitude of antibody response in a large community-based study (08 February 2021). medRxiv 2021.02.04.21251170; doi: https://doi.org/10.1101/2021.02.04.21251170 Link: https://www.medrxiv.org/content/10.1101/2021.02.04.21251170v1

medRxiv: Samanovic-Golden MI, Cornelius AR, Wilson JP, et al. Poor antigen-specific responses to the second BNT162b2 mRNA vaccine dose in SARS-CoV-2-experienced individuals (posted 09 February 2021). medRxiv 2021.02.07.21251311; doi: https://doi.org/10.1101/2021.02.07.21251311 Link: https://www.medrxiv.org/content/10.1101/2021.02.07.21251311v1

medRxiv: Washington NL, Gangavarapu K, Zeller M, et al. Genomic epidemiology identifies emergence and rapid transmission of SARS-CoV-2 B.1.1.7 in the United States (07 February 2021). medRxiv 2021.02.06.21251159; doi: https://doi.org/10.1101/2021.02.06.21251159 Link: https://www.medrxiv.org/content/10.1101/2021.02.06.21251159v1

medRxiv: Yang J, Marziano V, Deng X, et al. Can a COVID-19 vaccination program guarantee the return to a pre-pandemic lifestyle? (05 February 2021). medRxiv 2021.02.03.21251108; doi: https://doi.org/10.1101/2021.02.03.21251108 Link: https://www.medrxiv.org/content/10.1101/2021.02.03.21251108v1

PsyArXiv: Petersen M, Christiansen LE, Bor A, et al. Communicate Hope to Motivate Action Against Highly Infectious SARS-CoV-2 Variants. PsyArXiv. February 9. doi:10.31234/osf.io/gxcyn. Link: https://psyarxiv.com/gxcyn

News in Brief

AP: Associated Press. Mike Stobbe and Hannah Fingerhut. AP-NORC poll: A third of US adults skeptical of COVID shots (10 February 2021). Link: https://apnews.com/article/ap-norc-poll-3rd-adult-skeptical-vaccine-3779574a6d45d38cfc1d8615eb176b2d

Atlantic: The Atlantic. Sarah Zhang. What If We Never Reach Herd Immunity? (09 February 2021). Link: https://www.theatlantic.com/health/archive/2021/02/herd-immunity-might-be-impossible-even-vaccines/617973

FDA: US Food & Drug Administration. Coronavirus (COVID-19) Update: FDA Announces Advisory Committee Meeting to Discuss Janssen Biotech Inc.'s COVID-19 Vaccine Candidate (04 February 2021). Link: https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-announces-advisory-committee-meeting-discuss-janssen-biotech-incs

ICL: Imperial College London. Justine Alford. COVID-19 linked with wider set of symptoms than previously thought – REACT study (10 February 2021). Link: https://www.imperial.ac.uk/news/214693/covid-19-linked-with-wider-symptoms-than/

J Assist Reprod Genet: Scarica C, Parmegiani L, Rienzi L, Anastasi A, Cimadomo D, Klinger FG, Licata E, Sosa Fernandez L, De Santis L. SARS-CoV-2 persistence at subzero temperatures. J Assist Reprod Genet. 2021 Feb 5:1–3. doi: 10.1007/s10815-021-02094-4. Epub ahead of print. PMID: 33544317; PMCID: PMC7863614. Link: https://link.springer.com/article/10.1007%2Fs10815-021-02094-4

KHN: Kaiser Health News. JoNel Aleccia. Why the U.S. Is Underestimating Covid Reinfection (08 February 2021). Link: https://khn.org/news/article/why-the-u-s-is-underestimating-covid-reinfection/

MIT Tech Rev: MIT Technology Review. Antonio Regalado. The fast-spreading coronavirus variant is turning up in US sewers (08 February 2021). Link: https://www.technologyreview.com/2021/02/08/1017609/the-fast-spreading-coronavirus-variant-is-so-prevalent-its-turning-up-in-us-sewers/

Nature: Nature. Giorgia Guglielmi. Rapid coronavirus tests: a guide for the perplexed (09 February 2021). Link: https://www.nature.com/articles/d41586-021-00332-4

Nature: Nature. Emiliano Rodríguez Mega. Trust in COVID vaccines is growing (10 February 2021). Link: https://www.nature.com/articles/d41586-021-00368-6

Nature: Nature. Benjamin Thompson, Noah Baker, and Amy Maxmen. Coronapod: Variants – what you need to know (05 February 2021). Link: https://www.nature.com/articles/d41586-021-00320-8

Politico: Politico. Jeremy B. White. South African variant detected in California for first time (10 February 2021). Link: https://www.politico.com/states/california/story/2021/02/10/south-african-variant-detected-in-california-for-first-time-1362652

Reuters: Reuters. COVID maths: All the virus in the world would fit in a coke can (10 February 2021). Link: https://www.reuters.com/article/us-health-coronavirus-maths/covid-maths-all-the-virus-in-the-world-would-fit-in-a-coke-can-idUSKBN2AA1B6

Reuters: Reuters. German sniffer dogs detect COVID-19 with 94% accuracy (03 February 2021). Link: https://www.reuters.com/article/us-health-coronavirus-germany-sniffer-do/german-sniffer-dogs-detect-covid-19-with-94-accuracy-idUSKBN2A32Q4

Reuters: Reuters. Sabine Siebold and Andreas Rinke. Germany extends lockdown amid fear of coronavirus variants (10 February 2021). Link: https://www.reuters.com/article/us-health-coronavirus-germany/germany-extends-lockdown-amid-fear-of-coronavirus-variants-idUSKBN2AA0VJ

SciAm: Scientific American. Kevin J. Tracey. Vaccines alone are not enough to beat COVID (07 February 2021). Link: https://www.scientificamerican.com/article/vaccines-alone-are-not-enough-to-beat-covid/

STAT: STATnews. Matthew Herper. South Africa halts rollout of AstraZeneca's Covid-19 vaccine after shot falters against variant (07 February 2021). Link: https://www.statnews.com/2021/02/07/south-africa-halts-rollout-of-astrazenecas-covid-19-vaccine-after-shot-falters-against-variant/

STAT: STATnews. Andrew Joseph. Covid-19 cases are falling in the U.S. It could be a calm before a variant-driven storm (10 February 2021). Link: https://www.statnews.com/2021/02/10/covid-19-cases-are-falling-variant-driven-storm/

USAMRIID: United States Army Medical Research Institute for Infectious Diseases. USAMRIID reference materials (accessed 12 February 2021). Link: https://www.usamriid.army.mil/education/instruct.htm

VF: Vanity Fair. Katherine Eban. "A Huge Potential for Chaos": How the COVID-19 Vaccine Rollout Was Hobbled by Turf Wars and Magical Thinking (05 February 2021). Link: https://www.vanityfair.com/news/2021/02/how-the-covid-19-vaccine-rollout-was-hobbled

WashPo: Washington Post. Gerry Shih. WHO team in Wuhan dismisses lab leak theory, continues hunt for intermediary coronavirus host (09 February 2021). Link: https://www.washingtonpost.com/world/asia_pacific/coronavirus-who-china-investigation-wuhan/2021/02/09/2af3c44c-6a79-11eb-a66e-e27046e9e898_story.html

WHO: World Health Organization. Resurgence of Ebola in North Kivu in the Democratic Republic of the Congo (07 February 2021). Link: https://www.afro.who.int/news/resurgence-ebola-north-kivu-democratic-republic-congo

Wired: Wired. Matt Reynolds. A lone infection may have changed the course of the pandemic (10 February 2021). Link: https://www.wired.co.uk/article/chronic-infection-uk-coronavirus-variant